

What is claimed is:

1. A method for preparing a film structure of a ferroelectric single crystal, which comprises the steps of: forming a layer of a material having a perovskite crystal structure on a substrate as an electrode layer, and growing a layer of a ferroelectric single crystal on the electrode material layer by a pulsed laser deposition (PLD) or metallorganic chemical vapor deposition (MOCVD) method.
2. The method of claim 1, wherein the grown ferroelectric single crystal layer has a thickness of 0.1 to 20 μm .
3. The method of claim 1, wherein the substrate is made of a silicon single crystal or a ferroelectric single crystal.
4. The method of claim 1, which further comprises polishing the single crystal substrate to form a single crystal substrate having an off-axed crystal structure
5. The method of claim 4, wherein the single crystal substrate has an off-axis angle of 0.1 to 10° with respect to the C axis.
6. The method of claim 1, wherein the electrode layer having the perovskite crystal structure is made of strontium ruthenate (SrRuO_3) or lanthanum nickelate (LaNiO_3).
7. The method of claim 1, wherein the electrode layer has a specific resistance of $9 \times 10^{-4} \Omega \text{ cm}$ or less.

8. The method of claim 1, which further comprises forming a metal oxide layer having a perovskite crystal structure on the substrate before the formation of the electrode layer.

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9. The method of claim 8, wherein the metal oxide layer having the perovskite crystal structure is made of strontium titanate (SrTiO_3).

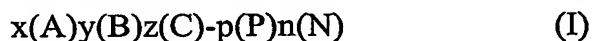
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10. The method of claim 1 or 8, wherein the electrode or metal oxide layer is formed by a PLD or MOCVD method.

11. The method of claim 1, wherein the ferroelectric single crystal has a dielectric constant of 1,000 or greater as measured in a film form.

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12. The method of claim 1, wherein the ferroelectric single crystal is LiNbO_3 , LiTaO_3 , $\text{La}_3\text{Ga}_5\text{SiO}_{14}$ or a material having the composition of formula (I):



wherein,

(A) is $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ or $\text{Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$,

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(B) is PbTiO_3 ,

(C) is LiTaO_3 ,

(P) is a metal selected from the group consisting of Pt, Au, Ag, Pd and Rh,

(N) is an oxide of a metal selected from the group consisting of Ni, Co, Fe, Sr, Sc, Ru, Cu and Cd,

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x is a number in the range of 0.65 to 0.98,

y is a number in the range of 0.01 to 0.34,

z is a number in the range of 0.01 to 0.1, and

p and n are each independently a number in the range of 0.01 to 5.

13. The method of claim 1, which further comprises forming a conductive metal layer on the surface of the ferroelectric single crystal layer opposite to the electrode layer having the perovskite crystal structure, by a sputtering or an electronic beam evaporation method.

14. The method of claim 1, which further comprises oxidizing the substrate by heat-treatment to form a thin oxide film of 1 μm or less on the substrate.

15. A ferroelectric single crystal film structure prepared by a method according to any one of claims 1 to 14.

16. An electric or electronic device comprising the ferroelectric single crystal film structure according to claim 15.